

Distributed Generation PV Installer Certification

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Representing: United States Department of Labor
Registered Electrical Apprenticeship and Training
Programs

Distributed Energy Rule Making Docket No. 12-0213

Credentialing:

- Duration: 5 year apprenticeship program
- 8000 hours total, 1200 classroom/lab, 6800 hours on the job
- United States Department of Labor registered and approved under submitted Standards
- Decades long relationship
- Journeypersons receive a completion certificate from the US Department of Labor
- Various skill enhancement courses are available throughout the electricians' career including updated Photovoltaic (PV) curriculum

US Dept of Labor Registered Programs - Community College Accredited Coursework

- Partial List of Courses and Content
- Conduit Bending, Math and Theory, Electrical Code and Blueprint, Circuits, Construction Shop, AC/DC Theory
- Fire Alarm, Motor Controls, Advanced Electrical Code, Advanced Conduit Bending, Communications
- Transformers, Instrumentation, Motors, Variable Frequency Drives, Programmable Controllers, Photovoltaics
- OSHA 10, NFPA 70E, First Aid/ CPR, Scaffolding, Lock out/tag out, Meter use and more

Job Description

United States Department of Labor

- **MAINTENANCE ELECTRICIAN**
- (615: Electrical and electronic equipment repairer)
- (6432: Electrician)
- Performs a variety of electrical trade functions such as the installation, maintenance, or repair of equipment for the generation, distribution, or utilization of electric energy. Work involves *most of the following*: installing or repairing any of a variety of electrical equipment such as **generators**, transformers, switchboards, controllers, circuit breakers, motors, heating units, conduit systems, or other transmission equipment; working from blueprints, drawings, layouts, or other specifications; locating and diagnosing trouble in the electrical system or equipment; working standard computations relating to load requirements of wiring or **electrical equipment**; and using a variety of electrician's handtools and measuring and testing instruments. In general, the work of the maintenance electrician requires rounded training and experience usually acquired through a formal apprenticeship or equivalent training and experience.

National Electrical Code Article 690

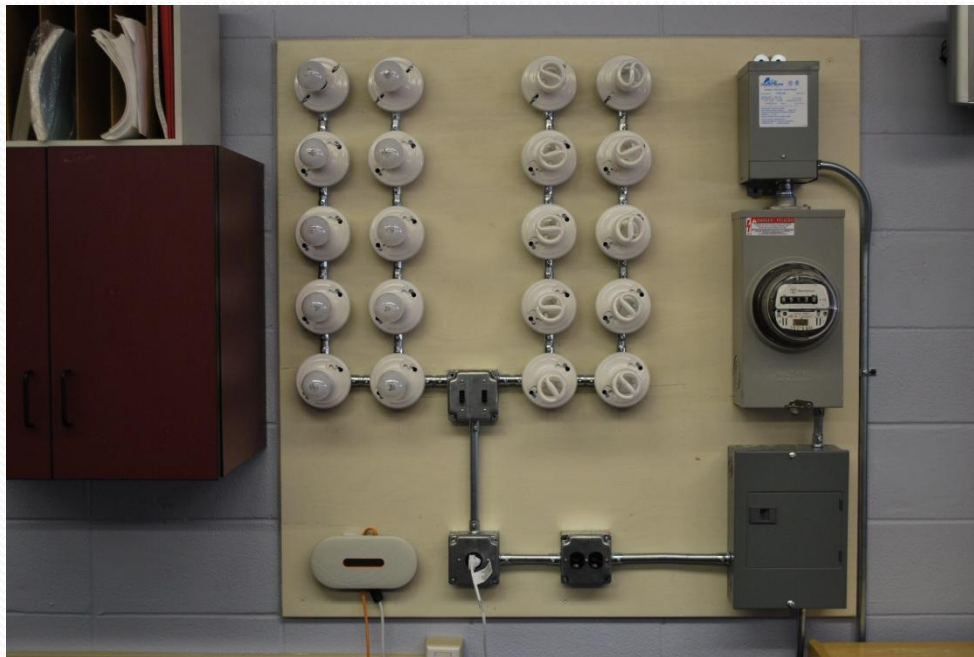
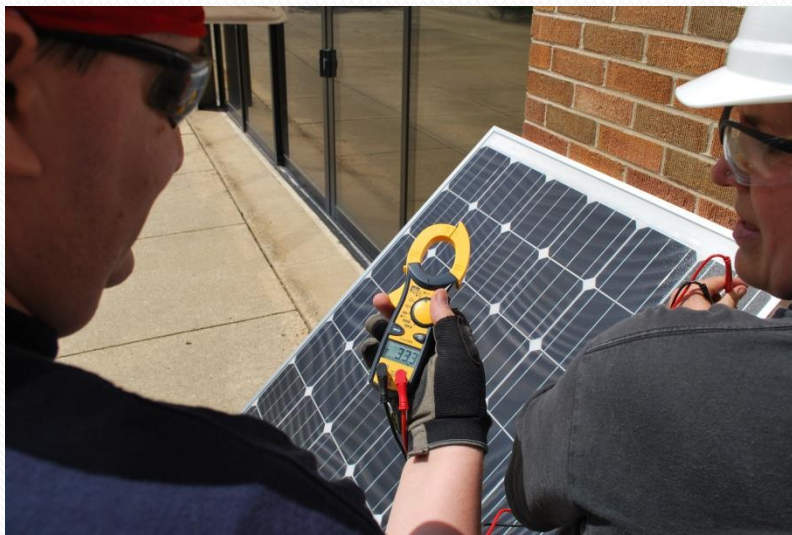
- Electrical work with circuit descriptions with mechanical integration
- NEC defines qualified persons
- Bolingbrook, ILL



US Dept of Labor Registered Programs

- **Results:**
- Approximately 20 Mega Watts installed by US Dept of Labor registered program graduates in Illinois to date.
- Largest urban PV installation in nation- 6G certified welding requirement
- Customer satisfaction, properly functioning systems yields validation

Rosemont Elementary 1.2 kW Volunteer Project- Rosemont, IL.



Typical Job Progression

- Electricians wire from project blueprints and schematics for PV projects
- Developed by architects or professional engineers
- Drawings approved by Authority Having Jurisdiction (municipality)

System Design, Project Management, NEC Compliance, Mechanical Requirements, Commissioning, Troubleshooting



Chicago, IL.



Evolving Electrical Technologies

- Examples: Variable frequency drives, programmable controllers, smart grid, process control, proportional control, HVAC control, BAC net
- Electricians have the requisite skill set
- Electricians are also mechanics: roof penetrations, concrete coring, bracketing (conduit and supports)

Illinois Commerce Commission Goal: Safe, Efficient Installations

- National Electrical Code (NEC) is a safety standard
- National Fire Protection Association (NFPA) statistics: 2007- 399,000 house fires, 2900 deaths, many electrical in origin
- NEC mandates: accurate load calculations, grounding and bonding, overcurrent protection, correct conductor size and other safety considerations
- Integral component of electrician training including both AC and DC theory

Additional Benefits

- Electrician/installer can identify unsafe residential/commercial electrical issues
- Ability to rectify unsafe electrical issues beyond PV (distributed generation)
- Troubleshooting ability in PV and electrical systems

US Department of Labor Certified Program Participants

- Are prepared technically both apprentices and journeypersons.
- Adaptable to changing and demanding construction environments
- Undergo leadership, people skill and foreman training
- Professionalism in customer interactions

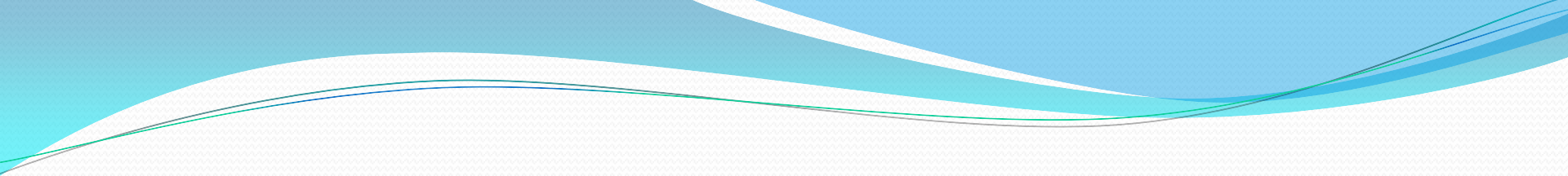
Illinois Commerce Commission (ICC) Considerations

- Electrician/installers should be certified individually by the ICC
- Certification requirements based on US Dept of Labor registered 5 year apprenticeship consisting of on-the-job and classroom components
- ICC individually certified electrician/installers ensure ongoing contact and project oversight

Registered Programs

- Outstanding past construction performance in Illinois
- Satisfying a societal need for skilled personnel
- Establishing a safe and efficient workplace

Logical source of credentialed distributed generation
PV installers

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- US Depart of Labor registered programs have multiple training center locations statewide with PV installations and training modules in place now
 - Individuals have thousands of hours of classroom and on the job experience.
 - Training center PV arrays provide real world installations
 - Residential/commercial, AC and DC outputs

Illinois Commerce Commission Recommendations

- A single certification is sufficient for all levels and types of PV installations
- Safety and electrical realities are not limited by KVA(size)
- All PV systems can produce hundreds of DC volts
- All PV systems can yield significant short circuit availability
- Injury or electrocution always a possibility
- US Dept. of Labor Registered programs produce skilled tradespeople in all facets of electrical work
- Principles of installation are comparable across PV spectrum: residential/commercial
- Single certification less cumbersome for ICC oversight

Illinois Business Facts

- Thousands of businesses in Illinois employ US Dept of Labor Registered program graduates and apprentices
- Employers range from large electrical contractors to 'small businesses' with one or two employees
- ICC certification provides legitimate businesses a pathway to the orderly and safe development of Illinois PV
- Employers of these graduates are licensed, bonded and insured as per the State of Illinois
- Thousands of US Depart of Labor Registered program graduates live in Illinois and are a readily available workforce